

WHAT IS CLAIMED IS:

1. A method of depositing a predoped organic light emitting material to form a layer in an organic light-emitting device, comprising the steps of:

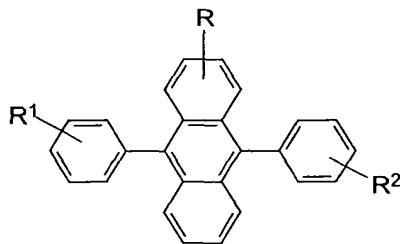
(a) providing a homogeneous solid mixture capable of being deposited which includes at least one organic light-emitting host material and at least one luminescent organic dopant material; and

(b) depositing the homogeneous solid mixture to form a layer in an organic light emitting device.

2. The predoped organic light-emitting material of claim 1 wherein the organic light-emitting host material includes one or more host components, each host component having a predetermined evaporation temperature T and one or more organic light-emitting dopant material, each organic light-emitting dopant material having an evaporation temperature in a range of from $(T-40)^{\circ}\text{C}$ to $(T+40)^{\circ}\text{C}$.

3. The predoped organic light-emitting material of claim 1 wherein the at least one luminescent organic dopant material has a concentration in the organic light-emitting host material in a range from 0.05 to 10.0 mole percent of the homogeneous solid mixture.

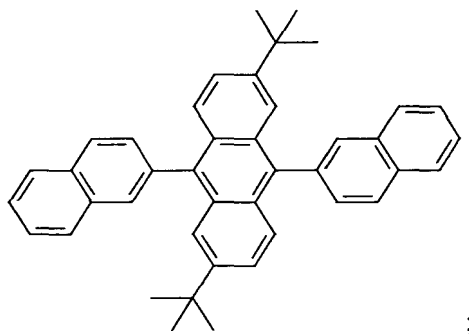
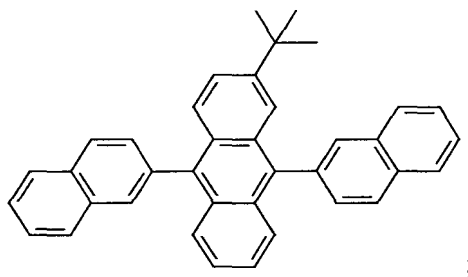
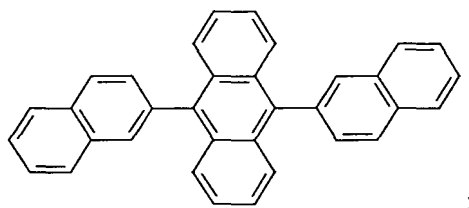
4. The predoped organic light-emitting material of claim 1 wherein the at least one organic light-emitting host material satisfies the structural formula:



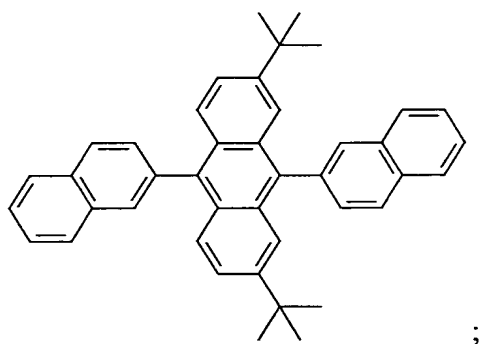
Wherein:

substituents R, R¹ and R² are each individually hydrogen, or alkyl of from 1 to 24 carbon atoms; alkoxy of from 1 to 24 carbon atoms; aryl or substituted aryl of from 5 to 20 carbon atoms; or heteroaryl or substituted heteroaryl of from 5 to 24 carbon atoms; or fused aryl groups containing from 4 to 12 carbon atoms; or fluorine, chlorine, bromine; or a cyano group.

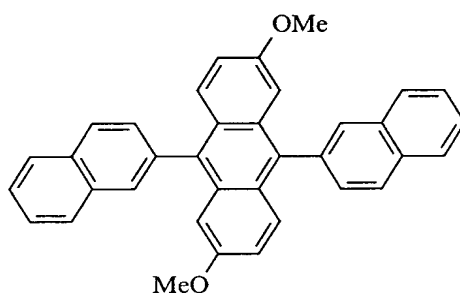
5. The predoped organic light-emitting material of claim 4 wherein the organic light-emitting host materials are selected from the group consisting of:



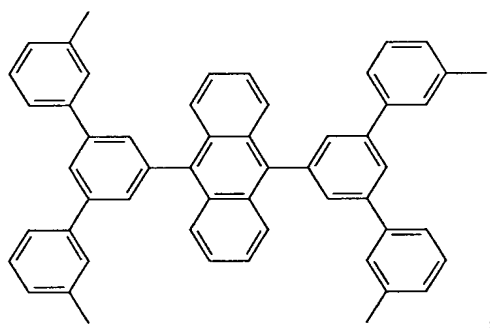
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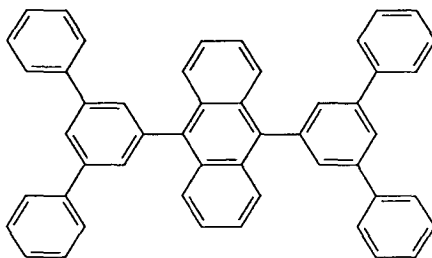
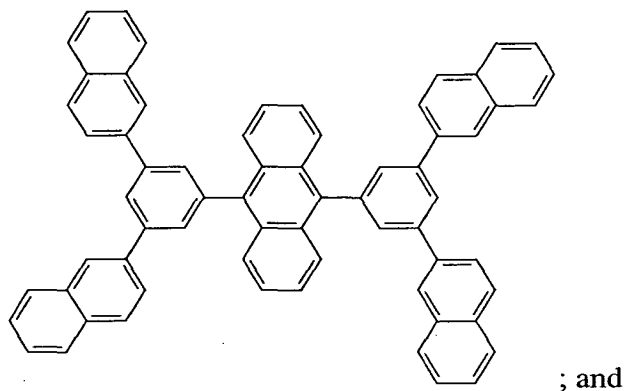
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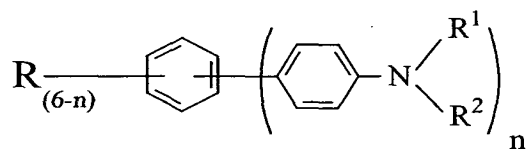
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6. The predoped organic light-emitting material of claim 1 wherein the at least one organic light-emitting host material satisfies the structural formula:



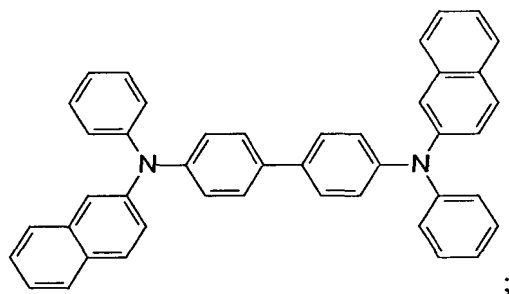
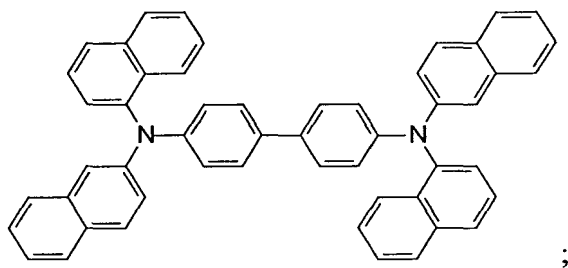
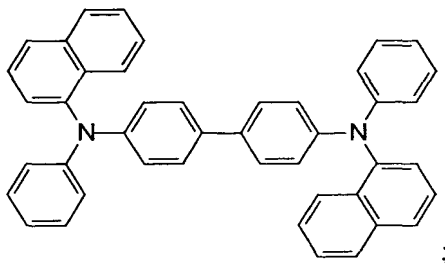
Wherein:

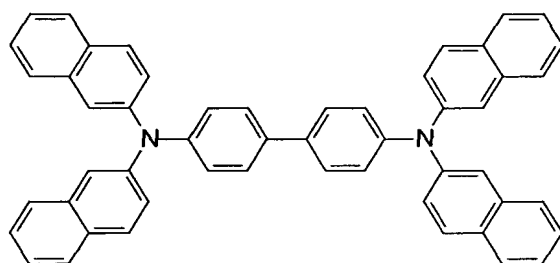
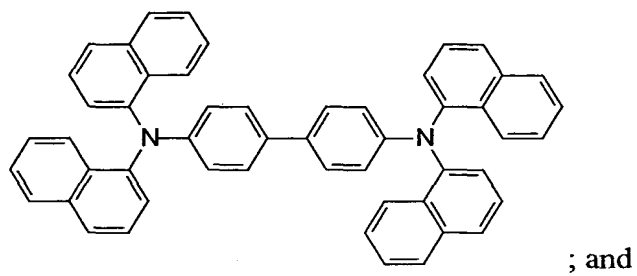
n is unequal to 1, 2, 3, 4, 5, or 6;

R¹ and R² are individually aryl or substituted aryl of from 5 to 20 carbon atoms; or heteroaryl or substituted heteroaryl of from 5 to 24 carbon atoms; or fused aryl groups containing from 4 to 12 carbon atoms;

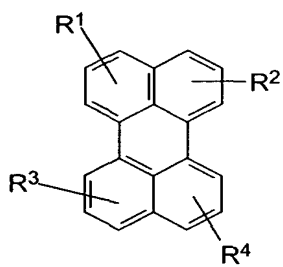
R is selected from group consisting of hydrogen and alkyl of from 1 to 24 carbon atoms.

7. The predoped organic light-emitting material of claim 6 wherein the organic light-emitting host materials are selected from the group consisting of:





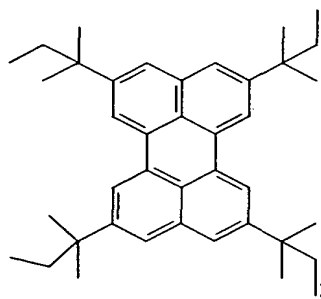
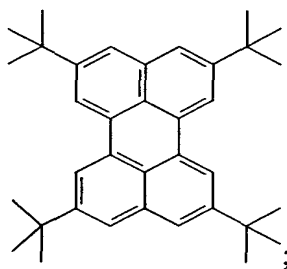
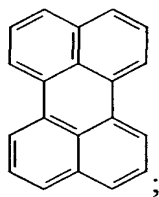
8. The predoped organic light-emitting material of claim 1 wherein the at least one organic light-emitting dopant material satisfies the structural formula:

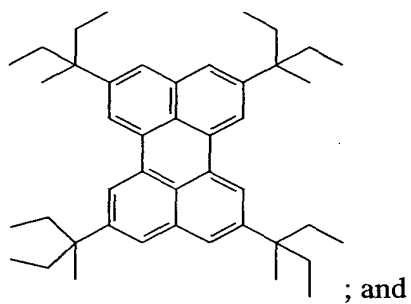


Wherein:

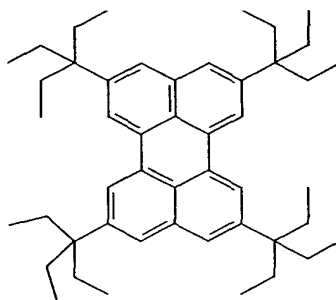
substituents R^1 , R^2 , R^3 and R^4 are each individually hydrogen, or alkyl of from 1 to 24 carbon atoms; alkoxyl of from 1 to 24 carbon atoms; aryl or substituted aryl of from 5 to 20 carbon atoms; or heteroaryl or substituted heteroaryl of from 5 to 24 carbon atoms; or fused aryl groups containing from 4 to 12 carbon atoms; or fluorine, chlorine, bromine; or a cyano group.

9. The predoped organic light-emitting material of claim 8 wherein the organic light-emitting dopant materials are selected from the group consisting of:

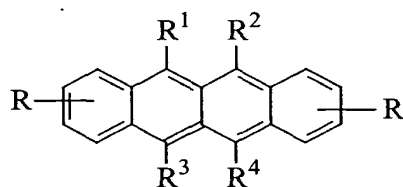




; and



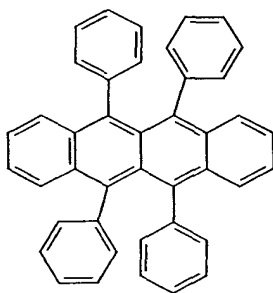
10. The predoped organic light-emitting material of claim 1 wherein at least one organic light-emitting dopant material satisfies the structural:



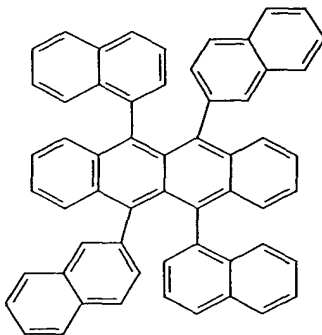
Wherein:

substituents R is each individually hydrogen, or alkyl of from 1 to 24 carbon atoms; alkoxy of from 1 to 24 carbon atoms; R^1 , R^2 , R^3 and R^4 are each individually aryl or substituted aryl of from 5 to 20 carbon atoms; or heteroaryl or substituted heteroaryl of from 5 to 24 carbon atoms; or fused aryl groups containing from 4 to 12 carbon atoms.

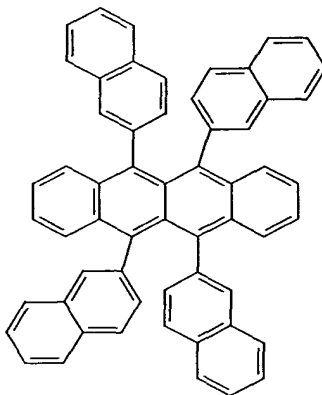
11. The predoped organic light-emitting material of claim 10 wherein the organic light-emitting dopant materials are selected from the group consisting of:



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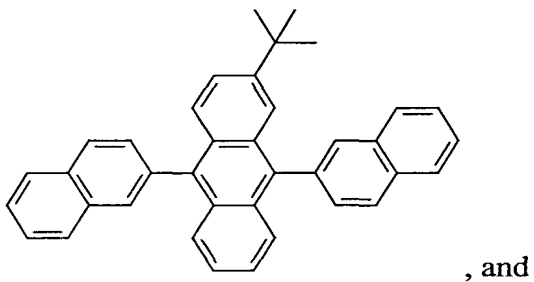


; and

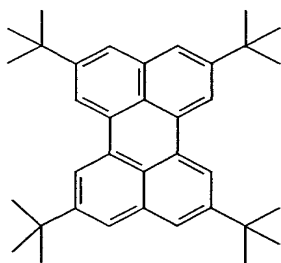


12. The predoped organic light-emitting material of claim 1 wherein the homogeneous solid mixture includes:

95 to 99.5 mole percent of organic light-emitting host material

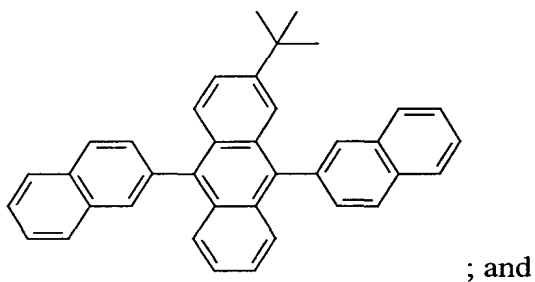


0.5 to 5 mole percent of light-emitting dopant materials

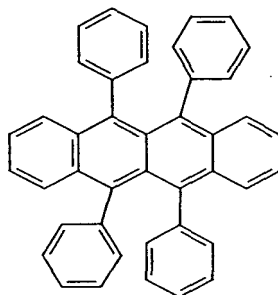


13. The predoped organic light-emitting material of claim 1 wherein the homogeneous solid mixture includes:

90 to 99 mole percent of the organic light-emitting host material



1 to 10 mole percent of light-emitting dopant materials



14. A method of depositing a predoped material to form a hole transporting layer in an organic light-emitting device, comprising the steps of:

(a) providing a homogeneous solid mixture capable of being deposited which includes at least one organic hole-transporting host material and at least one dopant material; and

(b) applying heat to evaporate the homogeneous solid mixture to form a hole transporting layer in an organic light emitting device.

15. A method of depositing a predoped material to form an electron-transporting layer in an organic light-emitting device, comprising the steps of:

(a) providing a homogeneous solid mixture capable of being deposited which includes at least one organic electron-transporting host material and at least one electron-transporting organic dopant material; and

(b) applying heat to evaporate the homogeneous solid mixture to form an electron-transporting layer in an organic light emitting device.

16. A method of making an organic light-emitting device having at least one doped organic layer, the method comprising the steps of:

(a) providing a light-transmissive substrate;

(b) forming a light-transmissive anode over the substrate;

(c) sequentially forming a multilayer organic electroluminescent (EL) medium structure over the anode;

(d) forming a cathode over the organic EL medium structure;

(e) providing a homogeneous solid mixture of a predoped organic material which includes at least one organic host material and at least one organic dopant material selected for forming the at least one doped organic layer of the organic EL medium structure; and

(f) forming the at least one doped organic layer by evaporating the homogeneous solid mixture of the predoped organic material from a evaporation deposition source.

17. The method of claim 16 wherein the providing step (e) includes the steps of:

(i) providing at least one solid organic host material having a host material vapor pressure, wherein the organic light-emitting host material includes one or more host components, each host component having a predetermined evaporation temperature T and one or more organic light-emitting dopant material, each organic light-emitting dopant material having an evaporation temperature in a range of from $(T-40)^{\circ}\text{C}$ to $(T+40)^{\circ}\text{C}$;

(ii) mixing a selected quantity of the at least one host material and a selected quantity of the at least one dopant material; and

(iii) forming a homogeneous mixture of the selected quantities of the at least one host material and of the at least one dopant material.

18. The method of claim 17 wherein the homogeneous mixture forming step includes the steps of:

(i) melting a mixture of a selected quantity of at least one host material and of a selected quantity of at least one dopant material in a container having a chemically non-reactive environment;

(ii) cooling the homogeneous mixture to ambient temperature; and

(iii) removing the homogeneous mixture of the predoped organic light-emitting material from the container.

19. The method of claim 17 wherein the homogeneous mixture forming step includes the steps of:

- (i) dissolving a mixture of a selected quantity of at least one host material and of a selected quantity of at least one dopant material in a solvent or in solvents within a container;
- (ii) evaporating the solvent or solvents; and
- (iii) removing the homogeneous mixture of the predoped organic light-emitting material from the container.

20. The method of claim 16 wherein the providing step e) includes the steps of:

- (i) providing at least one solid organic hole-transporting host material, wherein the solid organic hole-transporting host material includes one or more components, each component having a predetermined evaporation temperature T and one or more organic light-emitting dopant material, each organic light-emitting dopant material having an evaporation temperature in a range of from $(T-40)^{\circ}\text{C}$ to $(T+40)^{\circ}\text{C}$;
- (ii) mixing a selected quantity of the at least one hole-transporting host material and a selected quantity of the at least one dopant material; and
- (iii) forming a homogeneous mixture of the selected quantities of the at least one hole-transporting host material and of the at least one dopant material.

21. The method of claim 20 wherein the mixing step includes the step of:

mixing a selected quantity of at least one hole-transporting host material and a quantity of at least one hole-transporting dopant material selected to provide a dopant material concentration in the host material in a range from 1.0 to 50 mole percent.

22. The method of claim 16 wherein the providing step (e) includes the steps of:

- (i) providing at least one solid organic hole-transporting host material, wherein the solid organic hole-transporting host material includes one or more components, each component having a predetermined evaporation temperature T and one or more organic light-emitting dopant material, each organic light-emitting dopant material having an evaporation temperature in a range of from $(T-40)^{\circ}\text{C}$ to $(T+40)^{\circ}\text{C}$;
- (ii) mixing a selected quantity of the at least one electron-transporting host material and a selected quantity of the at least one dopant material; and
- (iii) forming a homogeneous mixture of the selected quantities of the at least one electron-transporting host material and the at least one dopant material.

23. The method of claim 22 wherein the mixing step includes the step of:

mixing a selected quantity of at least one electron-transporting host material and a quantity of at least one electron-transporting dopant material selected to provide a dopant material concentration in the host material in a range from 1.0 to 50 mole percent.

24. A method of making an organic light-emitting device having a doped light-emitting layer, the method comprising the steps of:

- (a) providing a light-transmissive substrate;
- (b) forming a light-transmissive anode over the substrate;
- (c) forming an organic hole-transporting layer over the anode;
- (d) providing a homogeneous solid mixture of a predoped organic light-emitting material which includes at least one organic light-emitting host material and at least one organic luminescent dopant material;

(e) forming a doped organic light-emitting layer over the hole-transporting layer by depositing the homogeneous solid mixture of the predoped organic light-emitting material from an evaporation deposition source;

(f) forming an organic electron-transporting layer over the light-emitting layer; and

(g) forming a cathode over the electron-transporting layer.

25. The method of claim 24 wherein the providing step (d) includes the steps of:

(i) providing at least one solid organic host material having a host material vapor pressure, wherein the organic light-emitting host material includes one or more host components, each host component having a predetermined evaporation temperature T and one or more organic light-emitting dopant material, each organic light-emitting dopant material having an evaporation temperature in a range of from $(T-40)^{\circ}\text{C}$ to $(T+40)^{\circ}\text{C}$;

(ii) mixing a selected quantity of the at least one host material and a selected quantity of the at least one dopant material; and

(iii) forming a homogeneous mixture of the selected quantities of the at least one host material and of the at least one dopant material.

26. The method of claim 25 wherein the homogeneous mixture forming step includes the steps of:

(i) melting a mixture of selected quantity of at least one host material and of a selected quantity of at least one dopant material in a container having a chemically non-reactive environment;

(ii) cooling the homogeneous mixture to ambient temperature; and

(iii) removing the homogeneous mixture of the predoped organic light-emitting material from the container.

27. The method of claim 25 wherein the homogeneous mixture forming step includes the steps of:

- (i) dissolving a mixture of a selected quantity of at least one host material and of a selected quantity of at least one dopant material in a evaporizable solvent or in evaporizable solvents within a container;
- (ii) evaporating the solvent or solvents; and
- (iii) removing the homogeneous mixture of the predoped organic light-emitting material from the container.

28. The method of claim 25 wherein the mixing step includes the step of:

mixing a selected quantity of at least one host material and a quantity of at least one dopant material selected to provide a dopant material concentration in the host material in a range from 0.05 to 5.0 mole percent.